

## REMARKS

Claims 1-4, 6, 8-9, 11-30, and 31-36 are pending in the application. Claims 11-30 are withdrawn from consideration. Claims 1-4, 6, 8-9, and 31-36 are under consideration. No new matter has been introduced by this Reply.

### **I. Rejections over U.S. Patent Application Publication No. US 2004/0152593**

Claims 1-4, 6, 8-9, and 31-36 have been rejected over the disclosure of U.S. Patent application publication number US 2004/0152593 to Cutler based upon a number of grounds. For the reasons set forth below, Applicants respectfully submit that these rejections should be withdrawn.

#### **A. Rejections under 35 U.S.C. § 102**

The Examiner has rejected claims 1-4, 8-9, 31-32 and 34-36 as allegedly being anticipated by the teachings of Cutler. In presenting this rejection, the Examiner has characterized Cutler as a prior art reference under section 102(a). Respectfully, Applicants submit this characterization of Cutler as a 102(a) reference is incorrect. Cutler was filed on March 27, 2003, prior to the September 30, 2003 filing date of the instant application. Further, Cutler did not become publicly available until it published on August 5, 2004, approximately 11 months after the September 30, 2003 filing date of the instant application. Therefore, at best, Cutler could only qualify as prior art to the instant claims under 35 U.S.C. § 102(e)/103 and not under section 102(a). Applicants respectfully request a correction in this regard.

With respect to the substantive merits of the instant novelty rejection, applicants disagree that Cutler anticipates the features of independent Claims 1, 3 and 31. It is well established that a novelty defeating reference must disclose each and every feature of a claim in order to anticipate that claim under any provision of section 102. To that end, independent Claims 1, 3 and 31 each recite a high porosity ceramic honeycomb support comprising specific combinations of properties, including cell wall thickness, porosity, median pore size, and coefficient of thermal expansion. In particular, Claim 1 recites a combination of a cell wall thickness of greater than 2.0 mil (0.0020 inch, 0.0508 mm) and up to 7 mil; a total porosity in the range of 45 to 75 %, a median pore size in the range of 2 to 10 micrometers, and a coefficient of thermal expansion (CTE)(25-800°C) of less than  $15 \times 10^{-7}/^{\circ}\text{C}$ . Similarly, Claim 3 recites a combination of a cell wall thickness in the range of 2.5 mil (0.0025 in., 0.0635 mm) to 3 mil (0.0030 in., 0.0762 mm), a total porosity in the range of 45 to 75%, a

median pore size in the range of 2 to 10 micrometers, and a coefficient of thermal expansion (CTE)(25-800°C) of less than  $15 \times 10^{-7}/^{\circ}\text{C}$ . Likewise, Claim 31 recites a combination of a cell wall thickness in the range of 2.5 mil (0.0025 in., 0.0635 mm) to 7 mil (0.0070 in., 0.1778 mm), a total porosity in the range of 50% to 65%, a median pore size in the range of 2 to 10 micrometers, and a coefficient of thermal expansion (CTE)(25-800°C) of less than  $15 \times 10^{-7}/^{\circ}\text{C}$ . Accordingly, not only are the above claimed properties features of applicants claims, but it also follows that the specific claimed combination of properties are a feature of these claims. As such, it is insufficient for a novelty rejection to be based upon a reference that only generically discloses certain claimed features individually without teaching those features together in the claimed combination.

Although Cutler discloses high porosity ceramic honeycomb substrates that can individually possess some of the claimed properties of cell wall thickness, porosity, median pore size, and coefficient of thermal expansion, Cutler significantly fails to teach the specific combination of properties set forth above. In fact, the only specific combinations of cell wall thickness, porosity, median pore size, and coefficient of thermal expansion that Cutler discloses are found in his Examples. However, as noted in paragraph [0026], all of Cutler's examples were prepared having cell wall thicknesses of 0.012 inches or 12 mils, which is significantly greater than the cell wall thickness recited in any of applicants claims 1, 3 or 31. Therefore, irrespective of the remaining porosity, median pore size, and coefficient of thermal expansion data reported in those Examples, it necessarily follows that Cutler at least fails to disclose the claimed combination of properties set forth above. Accordingly, for at least this reason, Cutler fails to teach each and every feature of applicants claims and it is believed the instant novelty rejection should be withdrawn.

#### **B. Rejections under 35 U.S.C. § 103**

The Current Office Action also rejects the median pore size feature of dependent claims 6 and 33 under 35 U.S.C. § 103(a) as allegedly being obvious and unpatentable Cutler. While Applicants do not agree with or concede the merits of this rejection, Applicants submit that Cutler is not available for use as prior art against the current claims in any obviousness rejection under section 103 because the invention of the Cutler reference and the claimed invention were, at the time the claimed invention was made, owned by or subject to an obligation of assignment to the same person or organization, namely Corning Incorporated.

35 U.S.C. 103(c) explains that subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person. Further, MPEP Section 706.02(I)(1) I. states that this provision of 35 U.S.C. § 103(c)(1) is effective for all applications pending on or after December 10, 2004, and hence applies to the instant application.

As set forth above, Cutler did not become publicly available until its publication date of August 5, 2004, approximately 11 months after the filing of the instant application. Therefore, in an obviousness context, the Cutler reference could at best only qualify as prior art against the current claims as a 102(e)/103 type reference and not as a 102(a) type reference. As such, under the provision of 35 U.S.C. § 103(c)(1) set forth above, Cutler is not available for use as prior art against the present invention pursuant to any obviousness rejections under 35 U.S.C. § 103(a). Thus, due to the disqualification of Cutler as available prior art for any obviousness rejection, any obviousness rejection of Applicants claims in view of Cutler is improper and should be withdrawn.

Moreover, notwithstanding the disqualification of Cutler as available prior art in the obviousness context, Applicants further submit that the claimed median pore size range of 2 to 4 micrometers as recited in Claims 6 and 33 would not have been obvious to one of ordinary skill in the art in view of Cutler's disclosure.

In presenting this obviousness rejection the Examiner contends that the compositional proportions taught by Cutler overlap those of the instant claims and therefore establish a *prima facie* case of obviousness. This is incorrect. Claims 6 and 33 are directed to median pore size diameters within the range of 2 to 4 micrometers. Contrary to the assertion in the rejection, nowhere in Cutler is there a teaching or suggestion of a porosity having a median pore diameter of 2 to 4 micrometers, nor is there any teaching or suggestion of any range of median pore diameters that would overlap the claimed range of 2 to 4 micrometers. In fact, Cutler makes clear that his median pore size diameter is in the range of greater than 5 micrometers to less than 30 micrometers. Accordingly, the basis for the Examiner's *prima facie* case of obviousness is incorrect as there is no teaching or suggestion in Cutler that would have motivated the skilled artisan to arrive at high porosity ceramic honeycomb

support comprising a median pore size diameter of 2 to 4 micrometers as recited in Claims 6 and 33.

## **II. Rejections over U.S. Patent No. 6,432,856 and U.S. Patent No. 6,159,893**

The Office Action has rejected claims 1-4, 6, 8, 9, and 31-36 under 35 U.S.C. § 103(a) as allegedly being obvious and unpatentable over the combined teachings of U.S. Patent No. 6,432,856 to Beall in view of U.S. Patent No. 6,159,893 to Kondo. To that end, it is well established that a *prima facie* case of obviousness requires an Examiner to show that the art of record teaches or at least suggests the claimed invention as a whole. Further, an Examiner must also identify the requisite motivate and expectation of success for one of ordinary skill in the art to make modification or combination proposed in the rejection. At least for this reasons set forth below, the Examiner has failed to satisfy these requirements

### **A. Claims 1, 3, 31**

Applicants' independent Claims 1, 3, and 31 are directed generally to ceramic honeycomb structures comprising a plurality of cells and having specified combinations of predefined cell wall thicknesses, total porosities, median pore size diameters and coefficients of thermal expansion (CTE). In particular, the structure of claim 1 includes a multiplicity of cells with walls defined by a thickness of greater than 2.0 mil and up to 7 mil, and having a total porosity in the range of 45 to 75 %, a median pore size in the range of 2 to 10 micrometers, and a coefficient of thermal expansion of less than  $15 \times 10^{-7}/^{\circ}\text{C}$ . The structure of claim 3 includes a multiplicity of cells with walls having a thickness in the range of 2.5 mil to 3 mil, and having a total porosity in the range of 45 to 75%, a median pore size in the range of 2 to 10 micrometers, and a coefficient of thermal expansion (CTE)(25-800°C) of less than  $15 \times 10^{-7}/^{\circ}\text{C}$ . Still further, the structure of Claim 31 includes a multiplicity of cells with walls defined by a thickness of a thickness in the range of 2.5 mil to 7 mil, and having a total porosity in the range of 50% to 65%, a median pore size in the range of 2 to 10 micrometers, and a coefficient of thermal expansion of less than  $15 \times 10^{-7}/^{\circ}\text{C}$ .

In rejecting these claims, the Examiner initially relies upon Beall for his alleged teaching of ceramic honeycomb articles having a CTE of  $5 \times 10^{-7}/^{\circ}\text{C}$ , pore sizes of 2 micrometers and cell wall thicknesses of 2.72 mils. The Examiner then acknowledges however that Beall fails to teach or suggest the claimed total porosities and only teaches ceramic honeycomb articles having a total porosity in the range of 20% to 30%.

Accordingly, the Examiner then turns to the teachings of Kondo for guidance in providing the claimed porosity ranges. Specifically, the Examiner contends Kondo teaches ceramic honeycomb structures having total porosities in the range of 45% to 80% and, therefore, it would have been obvious for the skilled artisan to modify the honeycomb structures of Beall to further include the total porosity of Kondo. Respectfully, the proposed modification of Beall in reliance on Kondo is misplaced.

Beall provides a ceramic substrate exhibiting a low thermal expansion and low total porosity. The porosity is uniquely comprised of small pores of a narrow size distribution and a generally elongated shape which are believed to contribute substantially to the unexpectedly high strength of these low CTE substrates. *See*, col. 2, lines 57-64. Beall further teaches that to achieve such properties it is necessary to utilize a specific combination of very fine average particle size, high surface area raw materials in a batch mixture. *See*, col. 3, line 65 – col. 4, line 1. Significantly, absent from Beall's batch mixture is the incorporation of any pore forming agents such as a combustible particles. In contrast, Kondo provides honeycomb structures having partitioning walls exhibiting excellent water-absorbability. *See*, col. 2, lines 1 – 6. This excellent water-absorbability is due to partitioning walls having porosity in the range of 45% to 85%. Kondo further teaches that this increased porosity is obtained from batch composition comprising combustible pore forming particles.

As one of ordinary skill in the art will appreciate, these ceramic structures of Beall and Kondo are formed from their respective extrusion batch compositions. Therefore, the proposed modification to Beall cannot be achieved by merely incorporating selected porosity features of Kondo's ceramic structure as suggested by the Examiner. Rather, to provide a ceramic structure having the claimed combination of properties would require a modification of Beall's batch mixture and subsequent processing conditions. Significantly, there is no direction in either Beall or Kondo as to how such a modification can be obtained. In fact, Kondo only teaches that his increased porosity is obtained by the incorporation of the combustible pore forming agents into the batch composition. To incorporate these combustible particles into the batch composition of Beall would alter the specific combination of very fine average particle size, high surface area raw materials acknowledged by Beall as necessary for achieving the unexpectedly high strength and low CTE substrates disclosed therein. Simply put, the proposed modification of Beall in view of Kondo is a hindsight reconstruction of art using Applicants' own disclosure as a blueprint for piecing together references in an effort to defeat the patentability of the claims. One of ordinary skill

in the art would not have been motivated to make the proposed modification set forth in the rejection nor would the skilled artisan have had expectation of success in arriving at the claimed structures.

Furthermore, even assuming *arguendo* that one of ordinary skill in the art would have sought to combine these disclosures as proposed in the rejection, the proposed combination would still fail to arrive at the honeycomb structures of Applicants' claims.

Each of independent claims 1, 3, and 31 recites a median pore diameter in the range of 2 to 10 micrometers. To that end, Kondo fails to mention pore sizes of any kind, much less a median pore size in the range from 2 to 10 micrometers as claimed. Similarly, although the Examiner suggests that Beall discloses pore sizes of 2 micrometers, Beall does not teach or suggest a total porosity having a median pore size in the range of 2 to 10 micrometer as claimed. Beall admittedly discloses that his ceramic structures can comprise a fine pore size distribution wherein at least 86% of the pores exhibit an pore size less than about 2 microns. *See*, col. 3, lines 50-52. However, this is wholly different from a median pore size of the total porosity. The only mention in Beall of an average or median pore size for a total porosity is in connection with the composition 1 of Table II wherein the average pore size is determined to actually be less than 1 micrometer and, thus, not in the range of from 2 to 10 micrometers. *See*, col. 7, lines 51-56. Furthermore, by requiring at least 86% of the total porosity to have a pore size less than about 2 micrometers, Beall actually teaches away from any median pore size of greater than or equal to 2 micrometers. Therefore, even if the skilled artisan would have made the proposed combination of Beall and Kondo, the result would still fail to arrive at the invention of claims 1, 3, and 31.

### **III. Rejections over U.S. Patent No. 4,888,317**

Claims 1-2, 4, 6, 8-9, 31-36 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious and unpatentable over U.S. Patent Number 4,888,317 to DeAngelis. At least for the reasons set forth below, the disclosure of DeAngelis fails to teach or suggest the invention of Claims 1 and 31 as whole and similarly fails to provide the requisite motivation and expectation of success to arrive at the invention of Claims 1 and 31.

As summarized above, independent Claims 1 and 31 are each generally directed to ceramic structures. Among several properties, these ceramic structures have total porosities where the median pore size of the porosity is in the range of from 2 to 10 micrometers. Contrary to the Examiner's assertion, DeAngelis does not teach or even suggest ceramic

structures having the claimed range of median pore size, nor would DeAngelis have provided the requisite motivation and expectation of success for one of ordinary skill in the art to arrive at a ceramic structure having the claimed range of median pore size.

As recognized by the Examiner, DeAngelis admittedly discloses a sintered porous structure having varying pore sizes in the range of from 1 to 20 microns. *See*, col. 7, lines 18-20. However, the Examiner has mischaracterized this as a recitation of median pore size as referred to in Applicants' claims. As one of ordinary skill in the art will appreciate, a median is a type of average that describes the number dividing the higher half of a population from the lower half. Significantly, DeAngelis is silent with respect to a median pore size value and merely describes that the population of pores in his sintered structure vary in size in the range of 1 to 20 microns. Therefore, because DeAngelis fails to teach or suggest what his median pore size can be, it similarly follows that DeAngelis fails to teach or even suggest the median pore size of Claims 1 and 31 respectively.

Furthermore, the Examiner also contends that it would have been obvious for one of ordinary skill in the art at the time of the invention to adjust the size of the pores in the claimed range of median pore sizes for the intended application. In support of this position, the Examiner specifically relies upon a holding that discovering an optimum value of a result effective variable only involves routine skill in the art. What the Examiner fails to appreciate however is that the median pore size must also be identified or at least suggested in the relied upon art as a result-effective variable in order for the optimization of the median pore size to be *prima facie* obvious. *See In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (CCPA 1977). That is, the skilled artisan would not attempt to optimize the median pore size if the artisan did not first understand that there exists a relationship between the median pore size and a desired result. Here, as discussed above, DeAngelis is completely silent with respect to median pore sizes and, therefore, fails to recognize any relationship between median pore size and a desired result. Thus, one of ordinary skill in the art would not have been motivated by DeAngelis to optimize the median pore size within the range set forth in Claims 1 and 31 and those claims depending therefrom.

With respect to the rejection of Claims 32 and 34 -35, Applicants remind the Examiner that these claims depend from independent Claim 3. Claim 3 has not been rejected under 35 U.S.C. § 103(a) as allegedly being obvious and unpatentable over DeAngelis. To that end, when an independent claim is considered non-obvious over a cited reference then it

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is axiomatic that any claim depending therefrom is also non-obvious over that cited reference. Accordingly, the instant rejection of claims 32-35 is also improper and should be withdrawn.

### CONCLUSION

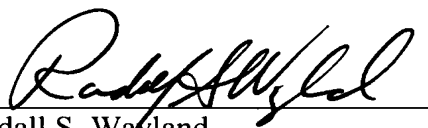
In view of the foregoing Remarks, it is respectfully submitted that the rejections set forth in the May 14, 2007 Office Action have been overcome and pending claims 1-4, 6, 8-9, 11-30, and 31-36 are in condition for allowance. Applicants earnestly seek notification of same.

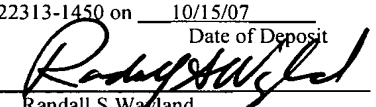
A response to the May 14, 2007 Office Action was initially due on August 14, 2007. Therefore, a two (2) month extension of time is necessary to make this Reply timely. Applicants respectfully request that the Patent Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorizes the Patent Office to charge any necessary fee or surcharge with respect to extension of time to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Randall S. Wayland at 607-974-0463.

Respectfully submitted,

Date: October 15, 2007

  
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<p>I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on <u>10/15/07</u> Date of Deposit</p> <p> Randall S. Wayland</p>
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